

**IN THE CLAIMS:**

1. (Currently Amended) A system for determining propagation characteristics of a photonic structure having a transverse N-fold symmetry, wherein N is an integer greater than zero, comprising:

/ a numerical analyzer that employs a leading order systematic homogenization expansion having multiple scales to develop an angularly averaged indexed profile for said photonic structure; and

a principal corrector, associated with said numerical analyzer, that employs details of said photonic structure and said homogenization expansion to obtain effective refractive indices of modes of said photonic structure.

2. (Original) The system as recited in Claim 1 wherein said modes are bound modes and said numerical analyzer incorporates decaying boundary conditions at spatial infinity.

3. (Original) The system as recited in Claim 1 wherein said modes are leaky, scattering or quasi-modes and said numerical analyzer incorporates outward-going radiation boundary conditions.

4. (Original) The system as recited in Claim 1 wherein said photonic structure has a simple layered potential corresponding to a simple layered refractive index profile.

5. (Original) The system as recited in Claim 1 wherein said photonic structure has

an arbitrary geometry.

6. (Currently Amended) A method of determining propagation characteristics of a photonic structure having a transverse N-fold symmetry, wherein N is an integer greater than zero, comprising:

employing a leading order systematic homogenization expansion having multiple scales to develop an angularly averaged indexed profile for said photonic structure; and

employing details of said photonic structure and said homogenization expansion to obtain effective refractive indices of modes of said photonic structure.

7. (Original) The method as recited in Claim 6 said modes are bound modes and said employing said leading order systematic homogenization expansion comprises incorporating decaying boundary conditions at spatial infinity.

8. (Original) The method as recited in Claim 6 wherein said modes are leaky, scattering or quasi-modes and said employing said leading order systematic homogenization expansion comprises incorporating outward-going radiation boundary conditions.

9. (Original) The method as recited in Claim 6 wherein said photonic structure has a simple layered potential corresponding to a simple layered refractive index profile.

10. (Original) The method as recited in Claim 6 wherein said photonic structure has

an arbitrary geometry.

11. (Original) A photonic structure designed by the method of Claim 6.
12. (Original) A photonic structure designed by the method of Claim 7.
13. (Original) A photonic structure designed by the method of Claim 8.
14. (Original) A photonic structure designed by the method of Claim 9.
15. (Original) A photonic structure designed by the method of Claim 10.